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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,364

02/27/2006

Jin-Suk Lee

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TIPS GROUP

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EXAMINER

CUTLIFF, YATE KAI RENE

ART UNIT

PAPER NUMBER

1621

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/551,364	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> YATE' K. CUTLIFF	<b>Art Unit</b> 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/27/2006 &amp; 9/25/2007</u> .                              | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The listing of references in the Search Report is not considered to be an information disclosure statement (IDS) complying with 37 CFR 1.98. 37 CFR 1.98(a)(2) requires a legible copy of: (1) each foreign patent; (2) each publication or that portion which caused it to be listed; (3) for each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion, unless the cited pending U.S. application is stored in the Image File Wrapper (IFW) system; and (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all patents, publications, applications, or other information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I. states, "the list ... must be submitted on a separate paper." Therefore, the references cited in the Search Report have not been considered. Applicant is advised that the date of submission of any item of information or any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the IDS, including all "statement" requirements of 37 CFR 1.97(e). See MPEP § 609.05(a).

### ***Drawings***

2. The drawing figures 2 and 3 are objected to under 37 CFR 1.83(a) because they fail to show production of a bio-diesel using a PFR as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed

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invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sucher & Holzer Bauplan Handel (AT 406870B) (Sucher) in view of Peterson et al. (JAOCS, Vol. 61, 1984).

7. The rejected claims cover, inter alia, a process for producing a bio-diesel oil by transesterifying oil/Fat with alcohol in a presence of alkyl ester. The dependent claims disclose the type of fat or oil used as feed stock, the type of alcohol, the ratio of alcohol to oil, the catalyst types and the type of reactor.

Sucher discloses a process for producing a fatty acid alkyl ester by transesterification of triglycerides with an alcohol in the presence of a basic catalyst and is characterized by a combination of the following steps: (1) the triglyceride is mixed with the alcohol and catalyst and converted to form two fluid phases, namely, a crude ester phase and a glycerin phase; (2) the two fluid phases are separated; (3) the crude ester phase is divided into two portions (A) and (B); (4) portion (A) is purified, producing substantially pure fatty acid alkyl ester; (5) portion (B) is mixed with more triglyceride for transesterification, more alcohol and more catalyst and converted to form two further fluid phases, namely, a crude ester phase and a glycerin phase; steps (2) - (5) are then repeated. (abstract). The catalyst used in Sucher is a homogeneous catalyst which can be basic or acidic; the oil/fat can be selected from a vegetable oil or animal fat; the alcohols can be methanol or ethanol, and the process can be continuous. (see English translation pages 2 & 3).

Sucher fails to disclose the use of a heterogeneous catalyst. However, Peterson et al. discloses that heterogeneous catalyst such as set out in Table II with catalyst activity set out in Table III. The reaction process used catalyst concentrations of 0.3-0.5% based on the weight of the vegetable oil. (see page 1593, column 2, first full paragraph).

All of the process steps of the claimed process are set out in Sucher and Peterson. Sucher teaches the transesterification process where alkyl ester is included as one of the reactants in the process; and Peterson et al. teaches the use of heterogeneous catalyst in a transesterification process for the production of diesel fuel.

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The only remaining differences are the range of alkyl ester returned to the transesterification process and the use of a batch reactor, a plug flow reactor or the use of a plurality of reactors. Each of these features is an old element common to the industrial transesterification process. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to prepare a biodiesel as suggested by Sucher in view of Peterson et al. to produce a bio-diesel oil.

Therefore, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, 82 USPQ2d 1385 (U.S. 2007).

With regard to any remaining limitations not disclosed in the prior art are deemed to be within the purview of an ordinary artisan. These limitations are deemed to be obvious absent a showing of unexpected results.

8. Claims 11-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sucher & Holzer Bauplan Handel (AT 406870B) (Sucher), in view of Lever Brothers & Unilever Limited (GB 612,667) (Lever) and Peterson et al. (JAOCS, Vol. 61, 1984).

9. The rejected claim covers, inter alia, a method of producing a bio-diesel oil, comprising: (a) pre-esterifying a free fatty acid, contained in oil/fat, with alcohol in a presence of an acidic catalyst; and (b) transesterifying the pre-esterified oil/fat and alcohol in a presence of alkyl ester. The dependent claims disclose the type of fat or oil

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used as feed stock, the type of alcohol, the ratio of alcohol to oil, the catalyst types and the type of reactor.

Applicant is directed to the discussion of Sucher as set out in paragraph 7. Sucher fails to disclose the teaching of a pre-esterification of the free fatty acid contained in the oil/fat in the presence of an alcohol and acid catalyst; the use of a heterogeneous catalyst.

However, Peterson et al. discloses that heterogeneous catalyst such as set out in Table II with catalyst activity set out in Table III. The reaction process used catalyst concentrations of 0.3-0.5% based on the weight of the vegetable oil. (see page 1593, column 2, first full paragraph).

Further, Lever discloses that the free fatty acid in the fatty stock (fat/oil) can be reacted with a lower alcohol and a acid alcoholysis catalyst to reduce the free fatty acid content of the fat stock, then continuing the transesterification process under alkaline conditions in the presence of a alkaline alcoholysis catalyst. (see page 2, lines 47-57).

All of the process steps of the claimed process are set out in Sucher, Lever and Peterson. Sucher teaches the transesterification process where alkyl ester is included as one of the reactants in the process; Lever teaches that to reduce the free fatty acid content in the fat/oil a pre-esterification step can be incorporated into the reaction process, and continuing through to transesterification; and Peterson et al. teaches the use of heterogeneous catalyst in a transesterification process for the production of diesel fuel. The only remaining differences are the range of alkyl ester returned to the transesterification process and the use of a batch reactor, a plug flow reactor or the use



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of a plurality of reactors. Each of these features is an old element common to the industrial transesterification process. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to prepare a biodiesel as suggested by Sucher in view of Lever and Peterson et al. to produce a bio-diesel oil.

Therefore, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, 82 USPQ2d 1385 (U.S. 2007).

With regard to any remaining limitations not disclosed in the prior art are deemed to be within the purview of an ordinary artisan. These limitations are deemed to be obvious absent a showing of unexpected results.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YATE' K. CUTLIFF whose telephone number is (571)272-9067. The examiner can normally be reached on M-TH 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel M. Sullivan can be reached on (571) 272 - 0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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